SAUTER

T11102

SAUTER flexotron®800
Ventilation application

User Guide

P100012091

Table of content

Table of content **2**

1 About this user guide **4**

2 About flexotron®800 ..... **5**

2.1 Ventilation application, overview of functions 5

3 Display, buttons and LEDs **7**

3.1 Display 7

3.2 Buttons and LEDs 8

4 The menu system **9**

4.1 Navigating the menus 9

4.2 Running mode 10

4.3 Temperature 12

4.4 Air control 17

4.5 Humidity control 19

4.6 Time settings 20

4.7 Access rights 22

5 Other functions **23**

5.1 Alarm handling 23

5.2 Free text 23

5.3 Revision numbers 23

5.4 Language 23

5.5 Indication LEDs 24

5.6 Changing the battery 24

5.7 Start assistant 25

5.8 Basic configuration for ventilation 26

Index **36**

1 About this user guide

This user guide covers all the models in the flexotron®800 series used with the ventilation application.
The document only covers functions which are available to users with Operator access and lower.
Revision A, February 2013
Software revision: 3.1

More information
More information about flexotron®800 can be found in:

- ***Manual* flexotron®800 *Ventilation*** – Complete manual for configuration and maintenance of flexotron®800 with ventilation application, available in English, German and French.
- ***Manual CASE flexotron®*** – Manual on how to configure the controllers using the PC software CASE flexotron®, available in English, German and French.
- ***Network variables for Modbus*** – Variable list for Modbus communication, available in English.
- ***CE - Declaration of conformity,*** flexotron®800

The information is available for download from SAUTER website, http://www.sauter-controls.com/en.

2 About flexotron®800

flexotron®800 is a series of pre-programmed, configurable controllers for different applications.
flexotron®800 series comprises three model sizes: 8, 15 or 28 in-/outputs.
Available with or without front panel display and buttons. For units without front panel display and buttons a separate, cable-connected terminal with display and buttons (RDB800) is available.
All normal handling can be done using the display and buttons or from a connected computer running CASE flexotron®.

2.1 Ventilation application, overview of functions

The controller is loaded with programs for controlling a ventilation unit. The temperature controller is based on a supply air PI-controller for heating control with a pre-programmed set of control modes. A number of different control functions as well as analogue and digital input and output functions can be bound to this controller. Certain functions are necessary, others can be seen as functional options. This flexibility means that what is shown in the display may differ from one unit to another, depending on which functions have been selected.
Functional choices are not made in the operator level, but in the Admin access level by educated personnel with specialised knowledge. The same applies to other configuration.
The program for an air handling unit contains, apart from other things, the following functions:

Different temperature control modes
Supply air temperature control, with or without outdoor temperature compensation
Room temperature control (cascade controller).
Extract air temperature control (cascade controller).
Seasonal switching between supply air temperature control and room/extract air temperature control.
Extra, separate temperature control circuit for after-heaters etc.

With control of:
Heat exchanger (liquid connected, plate or rotating) or mixing dampers.
Heating coil: Water with frost protection or electric with high temperature limit switch.
Chiler: Water-heated or DX, up to 3 steps.
Circulation pumps heating, cooling, exchanger.

Fan control
1- or 2-speed supply air fans and extract air fans.
Frequency controlled supply and extract air fans with pressure or flow control, manual control or external control from a VAV system. Pressure controlled supply air fan with slave connected extract air fan (output dependent or flow dependent).

Humidity control
Either humidification or dehumidification or both humidification and dehumidification can be used.

Timer control
For starting and stopping the unit. Up to 5 timer outputs for control of external functions such as lighting, doorlocks etc.

Demand control
In buildings with strongly varying occupancy the fan speeds or mixing dampers can be controlled by the air quality measured by a CO_2/VOC sensor.

Support control
When using the control function room control or extract air temperature control, it is possible to utilise support-heating and/or support-cooling.

Free cooling
When this function has been activated, it is used during the summer to cool the building during the night using cool outdoor air thereby reducing the need to run chillers during the day.

Enthalpy control
Measures and compares the energy content (enthalpy) of the outdoor air and the extract air (temperature and air humidity). When this function is active, the mixing damper signal will be overridden to recirculation if the enthalpy is higher outdoors than indoors.

Pretreatment
Damper and pump control for preheating or precooling of the outdoor air via an underground intake channel.

Cooling recovery
If the extract air is colder than the outdoor air and cooling is required, the heat exchanger control is reversed in order to return the cool extract air.

Recirculation control
Recirculation of air using a supply air fan and recirculation damper, with or without temperature control.

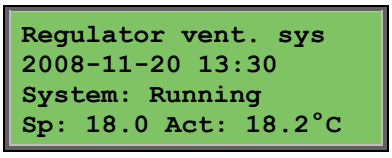
Step controllers Heating/Cooling
As an alternative to the analogue control of ”Actuator heating Y1” or ”Actuator cooling Y3” step controllers can be used for controlling heating or cooling in steps using digital control.

3 Display, buttons and LEDs

This section is applicable to flexotron®800 units with display and buttons but also to the hand terminal RDB800 which can be connected to flexotron®800 units without display and buttons.

RDB800F001

3.1 Display



The display has 4 rows of 20 characters. It has background illumination. The illumination is normally off, but is activated as soon as a button is pressed. The illumination will be turned off again after a period of inactivity.

3.2 Buttons and LEDs

ARROW Up:
(Up button)
Move up a row in the menu.
(Increase parameter value)

ARROW Down:
(Down button)
Move down a row in the menu.
(Decrease parameter value)

ARROW Right:
(Right button)
Move to a lower menu level.
(Move the cursor to the right in the parameter)

ARROW Left:
(Left button)
Move to a higher menu level.
(Move the cursor to the left in the parameter)

OK:
Open/Activate a selected menu/setting.
(Confirm a parameter value)

ALARM:
Press to view the alarm list.

CLEAR:
Reset/Abort a parameter change unless OK has already been pressed.

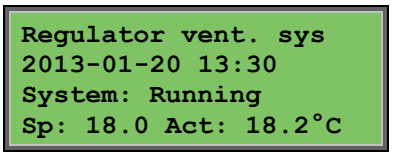
ALARM LED:
Red, flashing light when there is an unacknowledged alarm. Non-flashing light when there is an acknowledged alarm which has not been reset.

WRITE LED:
Some menus contain settable values. This is indicated by the yellow LED flashing. The value can be changed by pressing OK.

4 The menu system

4.1 Navigating the menus

The choice of access level/user access determines which menus are shown.



The start display, the display normally shown, is at the basic level of the menu tree. The appearance of the start display may vary since there are 5 types to choose from during configuration. The text in the first row can also be changed via CASE flexotron®.

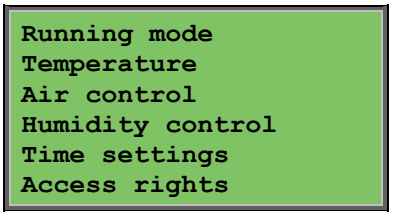
Sp and Act are Setpoint and Actual value for the supply air controller. This also applies when using cascaded room temperature or extract air temperature control.
Actual value = The current measured temperature.
Setpoint value = The desired configured temperature.
Pressing the Down button will move you through the menu choices at this, the lowest level.
The Up button will move you back through the choices.
Which menus are shown depends on which access level you are using (see the section Access rights for more information about logging on to higher levels).
The basic access level, the level normally active when you have not logged on, only shows a limited number of menus and submenus:

Running mode
Here, you can view and set the unit's running mode, as well as view selected control functions and alarm events.

Temperature, Air control and Humidity control
Here, relevant values and setpoint values are displayed. Setpoints can only be changed if you have Operator access or higher.

Time settings
Here, the time, date and set running times are shown. Values can only be changed if you have Operator access or higher.

Access rights
Here, you can log on to a higher level, log off to the basic level and change the password.



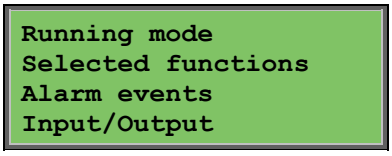
A user with Normal access, the basic level, can view a limited selection of menus. The unit's running mode can be changed and alarms acknowledged. If you have Operator access, you can access more information and change other operation parameters like setpoints and time functions.

To get to the next menu level, use the Up and Down buttons to place the display marker opposite the menu you wish to access and press the Right button. If you have sufficient log on privileges the display will change to the menu you have chosen.
At each level there may be several new menus through which you may move using the Up and Down buttons.
Sometimes there are further submenus linked to a menu or menu item. This is indicated by an arrow symbol at the right-hand edge of the display. To choose one, use the Right button again.
To go to a previous menu level, press the Left button.

4.1.1 Change parameters

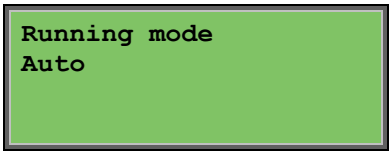
In some menus there are parameters that can be set. This is indicated by the yellow LED with ✎ flashing.
A quick blinking (2 times/s) indicates that the parameter can be changed using the present user access.
A slower blinking (1 time/s) indicates that a higher user access is required to change the parameter.
To change a parameter, first press the OK button. If you need a higher user access than you have to change the parameter, a log on menu will be displayed, see below. Otherwise, a cursor will appear at the first settable value. If you wish to change the value, do so by pressing the Up and Down buttons.
In numbers containing several digits you can move between the digits using the Left/Right buttons.
When the desired value is displayed press OK.
If there are further settable values displayed the cursor will automatically move to the next one.
To pass a value without changing it, press RIGHT.
To abort a change and return to the initial setting, press and hold the C-button until the cursor disappears.
Collected here are a number of menus showing running mode, selected functions, alarm events and status of inputs and outputs.

4.2 Running mode

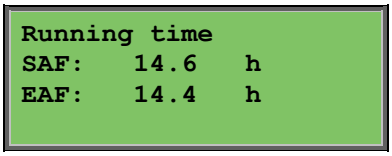


4.2.1 Running mode unit

The unit's running mode can be changed without logging on.

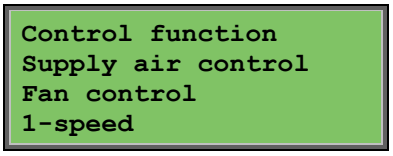


The running mode can be set to **Auto**, **Off, Manual reduced run** or **Manual normal run**. The **Auto** mode should normally be used. **Off** can be used to stop the unit for service and similar. **Manual normal run** or **Manual reduced run** will start the unit even if the timer says that the running mode should be "Off".
If the running mode is set to **Off**, **Manual normal run** or **Manual reduced run**, a C alarm is activated: Running mode Manual. The alarm automatically resets when the running mode is set to **Auto** again.

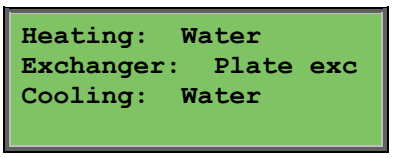


Shows the accumulated running times for the fans.

4.2.2 Selected functions

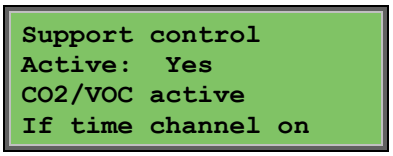


In these menus, you can see how some of the most important functions have been configured. Changes cannot be made.

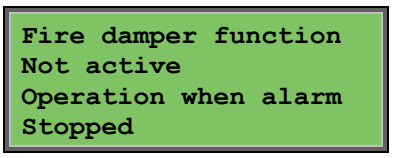


Heater, exchanger and cooling type.
If one of the functions is not used, it will be shown as ”Not used”.

This function is used during the summer to cool the building night-time using cool outdoor air, thereby reducing the need for cooling during the day and saving energy.

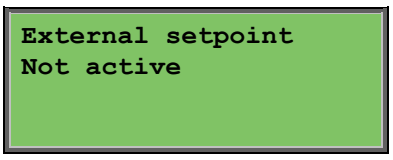


Support control is used for adjusting the room temperature outside of the normal running time. If there is a heating or cooling demand in the room, the unit will start and the temperature will be adjusted.



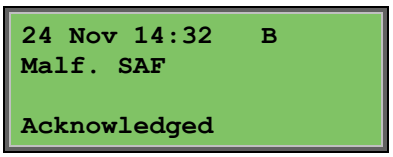
The fire function determines the settings for the fire dampers and the unit’s running mode when a fire alarm is activated.

Frost protection is normally always used in water heating systems. The cooling recovery function reverses the heat exchanger in order to return cooling from the extract air when the extract air is colder than the outdoor air and cooling is required.



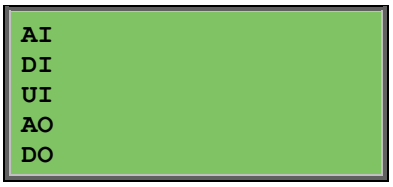
An analogue input can be configured for an external setpoint device.

4.2.3 Alarm events



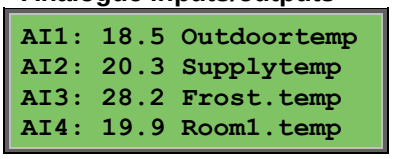
Alarm log which contains the 40 latest alarm events. The most recent event is listed first. The alarm log can only be used for viewing the alarm history. Alarms are handled in a special area, see the section Alarm handling.

4.2.4 Inputs/Outputs



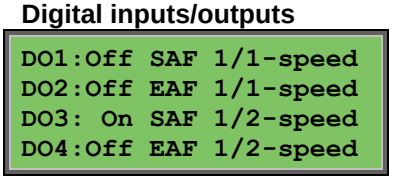
These menus show the current values for all configured inputs and outputs.
These are read-only menus. No changes can be made here.
Universal inputs can be configured as either analogue or digital inputs.
Analogue inputs and digital outputs are shown here as examples.

Analogue inputs/outputs



The current values for the analogue inputs and outputs are shown here.

Digital inputs/outputs

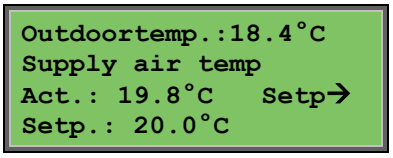


This menu shows if the digital inputs and outputs are On or Off.

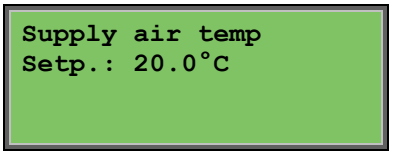
4.3 Temperature

Here you can view all actual and setpoint values for temperature control. The menu is visible to all users, regardless of log on level. However, to make changes you need at least Operator authority.
Only menus for activated functions will be shown.

4.3.1 Setpoint Supply air temperature control

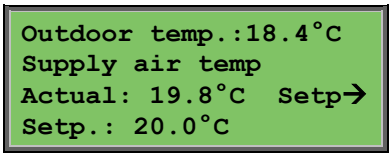


Setpoint Supply air control. Here, Actual and Setpoint values are shown, as well as the outdoor temperature if a outdoor sensor has been configured. This is a read-only menu. No settings can be made here.

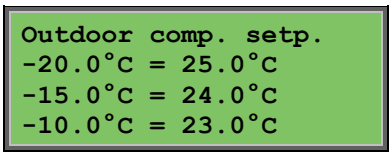


Submenu: Setpoint.

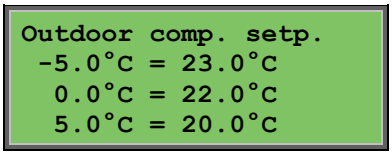
4.3.2 Setpoint Outdoor temperature compensated Supply air control



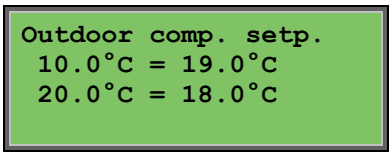
Setpoint Outdoor compensated supply air control. Here, Actual and Setpoint values are shown, as well as the outdoor temperature if a outdoor sensor has been configured. This is a read-only menu. No settings can be made here.



Submenus: Setpoint
In control modes Supply air control/Room control and Supply air control/Extract air control , the setpoint relationship is used when supply air control is active.



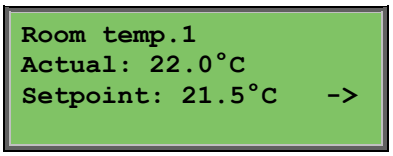
Use the eight breakpoints to generate a setpoint / outdoor temperature relationship.



In-between-values are calculated using straight lines between breakpoints. Setpoints for temperatures lower than the lowest breakpoint and higher than the highest breakpoint are calculated by extending the line between the two last breakpoints at either end.

Example: At the lower end the setpoint is increasing by 1°C for every 5 °C lowering of the outdoor temperature. So the setpoint at –23°C would be 25°C + .6x 1.0°C = 25.6°C.

4.3.3 Setpoint Cascaded Room temperature control

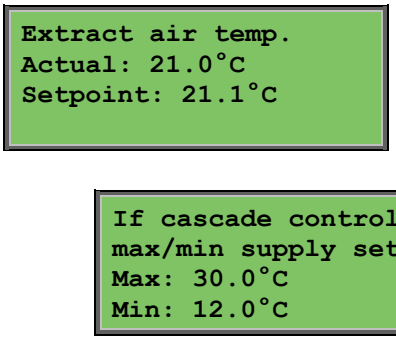


Setpoint Cascaded room temperature control.
In control mode Supply air control/Room control, the setpoint is used when cascade connected room control is active.

Submenu for setting the min and max limitation temperatures for the supply air.

If two room sensors have been configured you will also get this menu. The controller uses the average temperature of the two sensors.

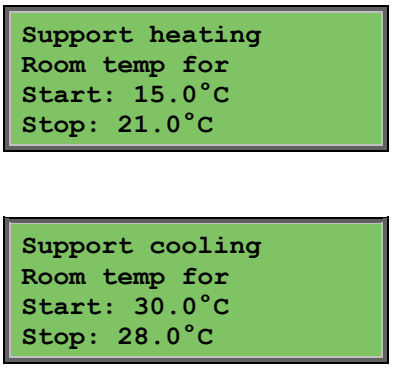
4.3.4 Setpoint Cascaded extract air temperature control



Setpoint Cascaded extract air temperature control.
In control mode Supply air control/Extract air control, the setpoint is used when cascaded extract air control is active.

Submenu for setting the min and max limitation temperatures for the supply air.

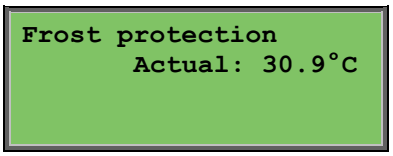
4.3.5 Support control heating / Support control cooling



Support control is normally used when room temperature control or extract air control has been configured, to prevent a too large offset in temperature when the unit is “Off”.

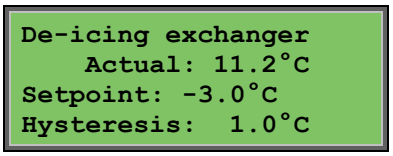
Support control Heating” or “Support control Cooling” will run if support control is configured, the running mode is "Off" (timer control OFF and not in extended running) and if conditions call for support control.
Minimum run time is settable 0 to 720 minutes (FS= 20 minutes).

4.3.6 Frost protection temperature



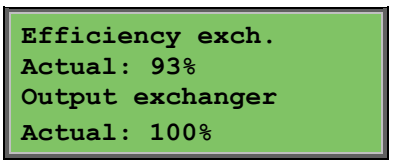
Relevant value for the water temperature at the frost protection sensor.

4.3.7 Exchanger de-icing



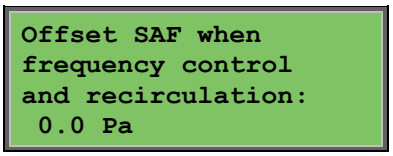
This menu is shown if exchanger de-icing has been configured. If the temperature at the de-icing sensor drops below the setpoint value, the de-icing function is started. It is stopped when the temperature has risen above the setpoint plus the set differential.

4.3.8 Heat exchanger efficiency monitoring

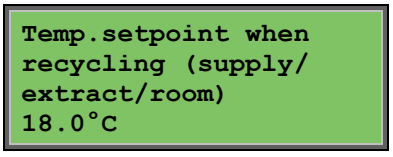


The function calculates the heat exchanger temperature efficiency in % when the output signal to the exchanger is higher than 5% and the outdoor temperature is lower than 10°C. The function requires an extract air sensor, an exhaust air sensor and an outdoor sensor.
When the control signal is lower than 5% or the outdoor temperature is higher than 10°C the display will show 0%.

4.3.9 Recirculation

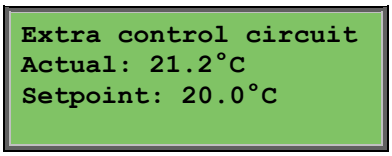


Recirculation is a function for distributing the air in the room using the supply air fan. The function can be used even when there is no heating or cooling demand. When using recirculation control, the extract air fan stops and a recirculation damper opens which allows the air to circulate through the unit.



During recirculation, offset SAF makes it possible to add to the supply air fan an offset to the setpoint during normal operation.
If pressure control has been configured, the offset is set in Pa. If flow control has been configured, it is set in m3/h. If manual control has been configured, the offset is set in %.
If you have selected the Offset function, which is a deviation from the regular supply air setpoint, you will instead be given the option to change this offset value here.

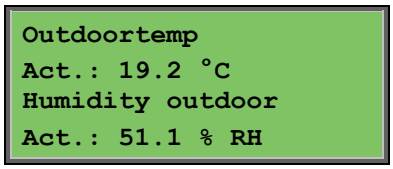
4.3.10 Extra control circuit



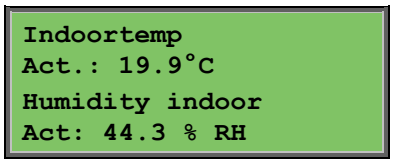
An independent temperature control circuit for control of for example after-heaters. The circuit can be configured to either heating or cooling.

4.3.11 Enthalpy control

Enthalpy control is a function for overriding the mixing damper output signal to recirculation if the enthalpy is higher outdoors than indoors.



Submenu for reading of outdoor temperature and outdoor air humidity.



Submenu for reading of indoor temperature and air humidity in the room.

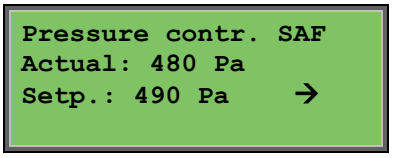
Shows if enthalpy control is active or not.

4.4 Air control

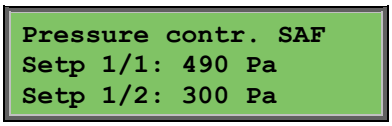
This menu is only shown if frequency controlled fans have been configured. Depending on the choice of fan control, different combinations of the menus below will be shown.

4.4.1 Pressure control SAF.

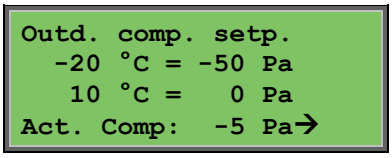
(There are also corresponding menus for EAF)



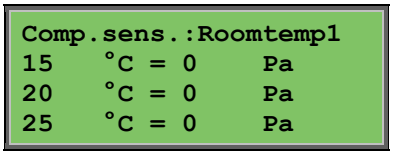
Setpoint Pressure control Here, Actual and Setpoint values are displayed. This is a read-only menu. No settings can be made here.



Submenu Setpoint values for normal speed (1/1) and reduced speed (1/2).



Submenu Outdoor compensation. An outdoor temperature dependent compensation of the pressure setpoint value can be added. The compensation can be set for either the supply air fan alone or for both fans.

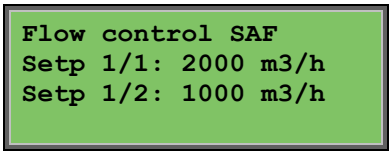


Submenu Extra compensation. A temperature dependent compensation similar to the one above but with selectable temperature source.

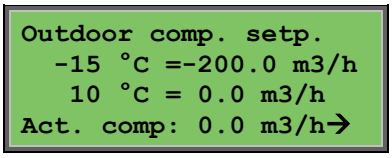
4.4.2 Flow control SAF.

(There are also corresponding menus for EAF)

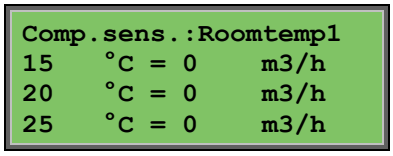
Setpoint Flow control. Here, Actual and Setpoint values are displayed. This is a read-only menu. No settings can be made here.



Submenu Setpoint values for normal speed (1/1) and reduced speed (1/2).



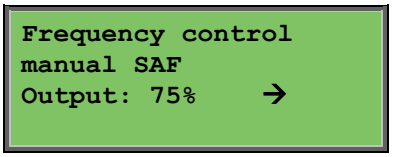
Submenu Outdoor compensation. An outdoor temperature dependent compensation of the pressure setpoint value can be added. The compensation can be set for either the supply air fan alone or for both fans.



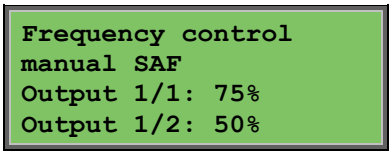
Submenu Extra compensation. A temperature dependent compensation similar to the one above but with selectable temperature source.

4.4.3 Manual frequency control SAF.

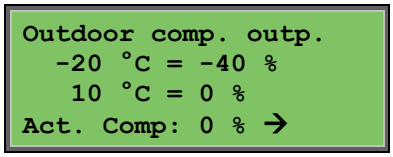
(There are also corresponding menus for EAF)



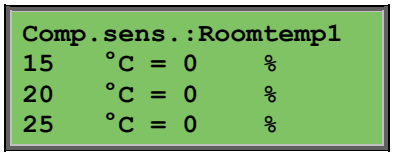
Setpoint Fixed output signal. Here, Actual and Setpoint values are displayed. This is a read-only menu. No settings can be made here.



Submenu Setpoint values for normal speed (1/1) and reduced speed (1/2). The setpoint is set in % of the full output. 100 % = 10 V output signal.



Submenu Outdoor compensation. An outdoor temperature dependent compensation of the pressure setpoint value can be added.
The compensation can be set for either the supply air fan alone or for both fans.



Submenu Extra compensation. A temperature dependent compensation similar to the one above but with selectable temperature source.

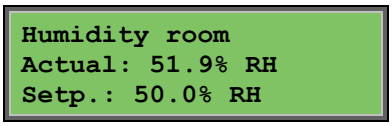
4.4.4 CO2 / VOC

In applications with varying occupancy, the fan speed can be controlled by the air quality as measured by a CO_2/VOC-sensor.

4.5 Humidity control

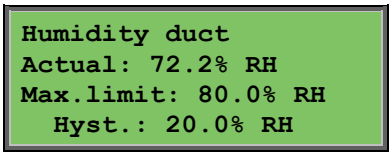
This menu is only shown if humidity control has been configured.

4.5.1 Humidity sensor room



Humidity control can be configured as either Humidification or Dehumidification or as combined Humidification/Dehumidification.

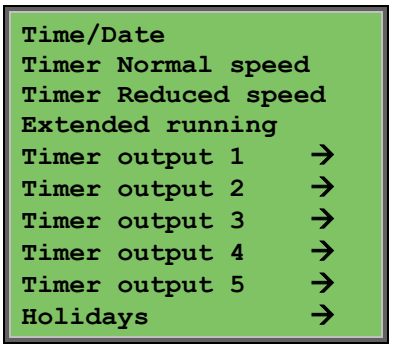
4.5.2 Humidity sensor duct



A duct humidity sensor is only used for maximum limitation function.

4.6 Time settings

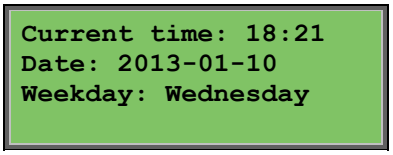
4.6.1 General



The controller has a year-base clock function. This means that a week-schedule with holiday periods for a full year can be set.
The clock has an automatic summertime/wintertime change-over.
Individual schedules for each week-day plus a separate holiday setting. Up to 24 individual holiday periods can be configured. A holiday period can be anything from one day up to 365 days. Holiday schedules take precedence over other schedules.

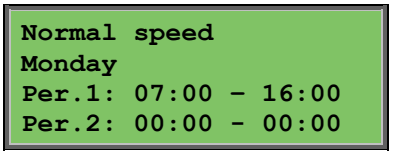
Each day has up to two individual running periods. For two-speed fans and pressure controlled fans there are daily individual schedules for normal speed and reduced speed, each with up to two running periods.
Up to 5 digital outputs can be used as timer controlled outputs. Each with individual week-schedules with two activation periods per day. These outputs can be used to control lighting, doorlocks etc. Only outputs which have been configured will be shown.

4.6.2 Time/Date



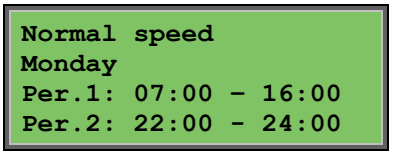
This menu shows and permits the setting of time and date.
Time is shown in 24-hour format.
Date is shown in the format YY-MM-DD.

4.6.3 Timer Normal speed

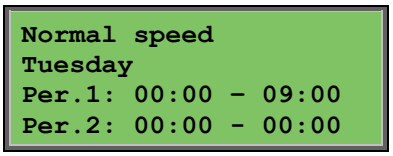


There are 8 separate setting menus, one for each weekday and one extra for holidays.
Holiday schedules take precedence over other schedules.
For 24 hour running, set a period to 0:00 – 24:00.

To inactivate a period, set the time to 00:00 – 00:00. If both periods of a day are set to 0:00 – 0:00, the unit will not run at normal speed that day.

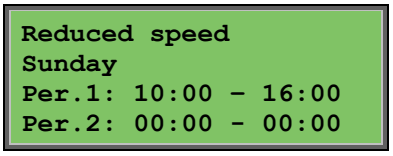


If you want to run the unit from one day to another, e.g. from Mon 22:00 to Tue 09:00, the desired running time for the various days must be entered individually.
First Mon 22:00 – 24:00....



... then Tue 00:00 – 09:00.

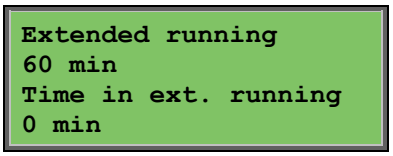
4.6.4 Timer Reduced speed



These settings will be ignored if single speed fans are configured.
Should periods for normal speed and periods for reduced speed overlap, normal speed takes precedence.

There are 8 separate setting menus, one for each weekday and one extra for holidays. Holiday schedules take precedence over other schedules. For 24 hour running, set a period to 00:00 – 24:00. To disable a period, set it to 00:00 – 00:00. If both periods of a day are set to 00:00 – 00:00, the unit will not run at Reduced speed that day.

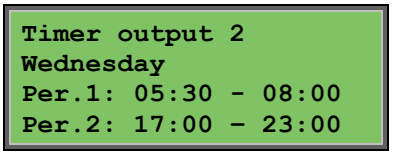
4.6.5 Extended running



Digital inputs can be used to force the unit to start although the timer says the running mode should be “Off”.
For 2-speed fans and pressure/flow controlled fans, inputs for normal speed and reduced speed can normally be used.
The unit will run for the set time. If the running time is set to 0 the unit will only run as long as the digital input is closed.

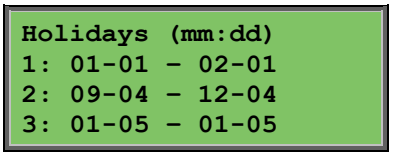
4.6.6 Timer outputs 1…5

Up to 5 digital outputs can be used as timer controlled outputs. Only outputs which have been configured will be shown. Each with individual week-schedules with two activation periods per day.



Each timer output has 8 separate setting menus, one for each weekday and one extra for holidays. Holiday schedules take precedence over other schedules.
If the function Recirculation has been configured, Timer output 5 can be used for controlling start/stop of the Recirculation function.

4.6.7 Holidays



Up to 24 separate holiday periods for a full year can be set.
A holiday period can be any number of consecutive days from one and upwards. The dates are in the format: MM-DD
When the current date falls within a holiday period, the scheduler will use the settings for the weekday “Holiday”.

4.7 Access rights

There are four different access levels, Normal level which has the lowest access and does not require logging on, Operator level, Service level and Admin level which has the highest access. The choice of access level determines which menus are shown, as well as which parameters can be changed in the displayed menus.
The basic level only permits changes in Running mode and gives read-only access to a limited number of menus.
Operator level gives access to all menus except Configuration.
Service level gives access to all menus except the submenus Configuration/In- and Outputs and Configuration/System.
Admin level gives full read/write access to all settings and parameters in all menus.

Repeatedly press down-arrow when the start-up display is shown until the arrow-marker to the left of the text-list points to Access rights. Press RIGHT.

4.7.1 Log on

In this menu it is possible to log on to any access level by entering the appropriate 4-digit code. The log on menu will also be displayed should you try to gain access to a menu or try to do an operation requiring higher authority than you have.
Press the OK button and a cursor marker will appear at the first digit position. Repeatedly press the UP button until the correct digit is displayed. Press the RIGHT button to move to the next position. Repeat the procedure until all four digits are displayed. Then press OK to confirm. After a short while the text on the line: Present level will change to display the new log on level. Press the LEFT button to leave the menu.

The Code for Operator acess level is 3333.

4.7.2 Log off

Use this menu to log off from the present level to the basic "no-log on" level.

4.7.3 Automatic logoff

If the access level is Operator, Service or Admin, the user will automatically be logged off to Normal after a settable time of inactivity. The time is settable.

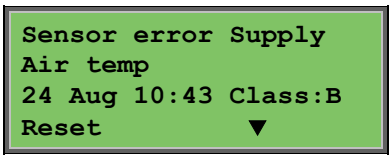
4.7.4 Change password

You can only change the password for access levels lower or equal to the presently active level.

5 Other functions

5.1 Alarm handling

If an alarm condition occurs, the red alarm LED on the front panel of units with display or the alarm LED on a connected display unit will start flashing. The LED will continue to flash as long as there are unacknowledged alarms.
Alarms are logged in the alarm list. The list shows type of alarm, date and time for the alarm and the alarm class (A, B or C alarm).
To access the alarm list, press the alarm button, the front panel button with the red button-top.



If there are multiple alarms, this is indicated by up / down arrow symbols at the right-hand edge of the display.
Use the UP and DOWN buttons to access the other alarms.

At the left end of the bottom display line the alarm status is shown. For active, unacknowledged alarms the space is blank. For alarms that have reset the text: Acknowledged, still active or blocked alarms are indicated by Acknowledged or Blocked.
Alarms are acknowledged by pressing the OK button. You are then given the choice of acknowledging the alarm or blocking the alarm.
Acknowledged alarms will remain on the alarm list until the alarm input signal resets.
Blocked alarms remain on the alarm list until the alarm has reset and the block has been removed. New alarms of the same type will not be activated as long as the block remains.

Since blocking alarms can be potentially hazardous, you need a high log on authority to block alarms.

Class A and B alarms will activate alarm output(s) if these have been configured.
Class C alarms do not activate the alarm output(s).
Class C alarms are removed from the alarm list when the alarm input resets even if the alarm has not been acknowledged.

5.2 Free text

If RIGHT is pressed once when the start-menu is shown, a menu showing text of your choice is displayed. The text can be used to show information concerning the commissioning company, name and phone number to service personnel etc. The easiest way to enter text is to use CASE flexotron®, but the buttons can also be used. Up to 4 lines of 20 characters can be entered.

5.3 Revision numbers

If RIGHT is pressed twice when the start-menu is shown, a menu showing the program revision number and ID number is displayed.

5.4 Language

If RIGHT is pressed three times when the start-menu is shown, a menu is displayed in which the language can be changed.
The different language files are stored in the application memory and are downloaded to the work memory. If a flexotron®800-controller via CASE flexotron® has been reloaded with a newer program revision than the factory revision, the

controller will not allow language files to be downloaded from the application memory. This is because there is a risk that the language files are not compatible with the new revision. Therefore, you are limited to the two languages you have downloaded using CASE flexotron®.

5.5 Indication LEDs

Status indication can be found in the upper left corner of the controller. For controllers with display, the alarm indication and change mode LEDs are located in the keypad area.

5.5.1 Status indication

Designation	Colour	Description
Tx	Green	Port 1, Transmitting
Rx	Green	Port 1, Receiving
Serv	Yellow	No longer in use
LAN (-Web models)	Yellow/Green	Green: Connected to other network equipment Blinking green: Network traffic Blinking yellow: For identifying
P/B (Power/Battery)	Green/Red	Power on/Battery error
Controllers with built-in display:		
	Red	Alarm indication
	Yellow	Change mode

5.6 Changing the battery

The controller flexotron®800 has an internal battery to ensure the operation of the memory and real-time clock in the event of a power failure.
When the alarm ”Internal Battery” is activated and the battery LED lights up red, the battery has become too weak and needs to be changed. Nonetheless, due to a backup capacitor, the controller will function at least 10 minutes without power supply.
Since changing the battery requires knowledge of proper ESD protection, as well as dismantling and opening of the unit, this should be handled by skilled service personnel.

5.7 Start assistant

When the controller is switched on for the first time, it runs through a special procedure:

1. Select one of the following applications by pressing the Down button:
   - Ventilation, Heating or Boiler

   then continue using the Right button.
2. Select application settings using the OK and Down buttons. The following selection options are available for the ventilation application:

○ Standard	Factory settings
○ 808 fixed-value	Fixed-value control for supply air
○ 815 fixed-value	Fixed-value control for supply air
○ 815 cascade control supply air	Cascade control for return air-
○ 828 cascade & CO2	Cascade control for return air-supply air including control of the CO_2 content using VFD
○ 828 cascade & humidity supply air	Cascade control for return air- with additional humidity control

The number at the start of the selection corresponds to the numbers in the item number of the device.

Selecting an application unsuitable for the device can result in the operating statuses of the inputs and outputs remaining undefined.

Select the application using the OK button. The cursor jumps to “Accept changes: No”. Then press the Up or Down button until the display changes to Yes. Press OK to confirm. The program loads and the default display appears.

The controller switches to normal operation. This procedure will not be repeated the next time the application is launched.

3. Select the language. To do so, press the Right button in the default display three times. Then press the OK button and use the Up or Down button to select the preferred language. Confirm the selection using the OK button.

5.8 Basic configuration for ventilation

In the start assistant (see previous section), each type of device features a choice of one or two configurations. These configurations can be applied without changes, or can be used as a starting point for individual customisations.

5.8.1 RDT808 – Supply air constant control

Structure of installation:

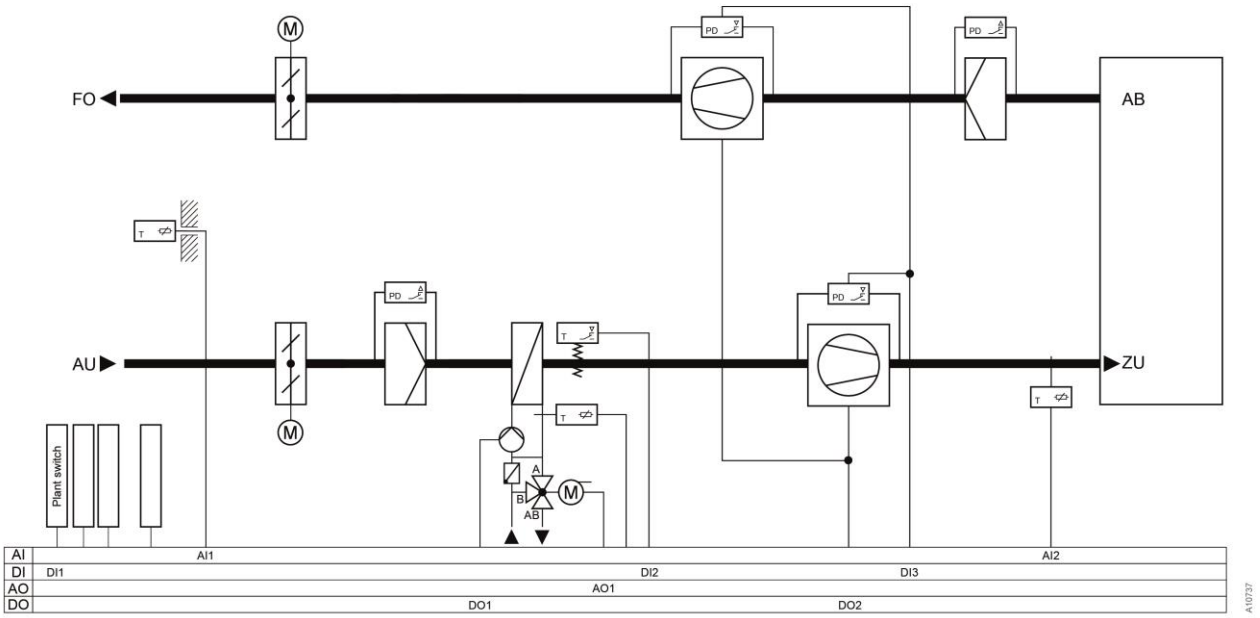
- Outside- and exhaust-air dampers
- Air filter
- 1-speed fan
- Heating coil with pump, regulating valve, frost monitor
- Supply air sensor
- Outside sensor

Closed-loop control functions:

- Temperature control for constant supply air

Open-loop control functions:

- Start-up circuit
- Frost monitor for heater
- Min./max. limit for inlet temperature
- Motor/air flow monitor
- Pump anti-jamming function
- Standstill control



Brief description:
The outside air and exhaust air dampers are closed when the plant is switched off. Operation of the plant is enabled using a switch, and the plant is run in automatic mode using the time programme.
If a fault is indicated in the air flow or supply air sensor, the plant is switched off. If the unit is operating fault-free, the temperature control system adjusts the setpoint to the one entered in the display using the heating coil.
The start-up circuit reduces the risk of faults due to frost when outside temperatures are very low.

Terminal assignment:

	LS	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
	MM	
	⏚	Earth wire
	+24V	+24 V DC. Reference point for digital inputs DI

1	D+	RS485 Modbus (not with web (TCP/IP) models)
2	D-	
3	C	
4	E	

42	LS	Reference point for digital outputs DO
41	DO1	Heating coil pump
40	DO2	Supply air fan

-	-	-
-	-	
-	-	

34	⊢	Reference potential for analogue inputs AI
33	AI1	Outside-temperature sensor
32	AI2	Sensor for supply air temperature

9	DI1	External OFF switch
10	DI2	Frost-protection facility
11	DI3	Supply air fan on

17	⊢	Reference potential for analogue outputs AO
18	AO1	Actuator for heater Y1

5.8.2 RDT815 – Supply air constant control

Structure of installation:

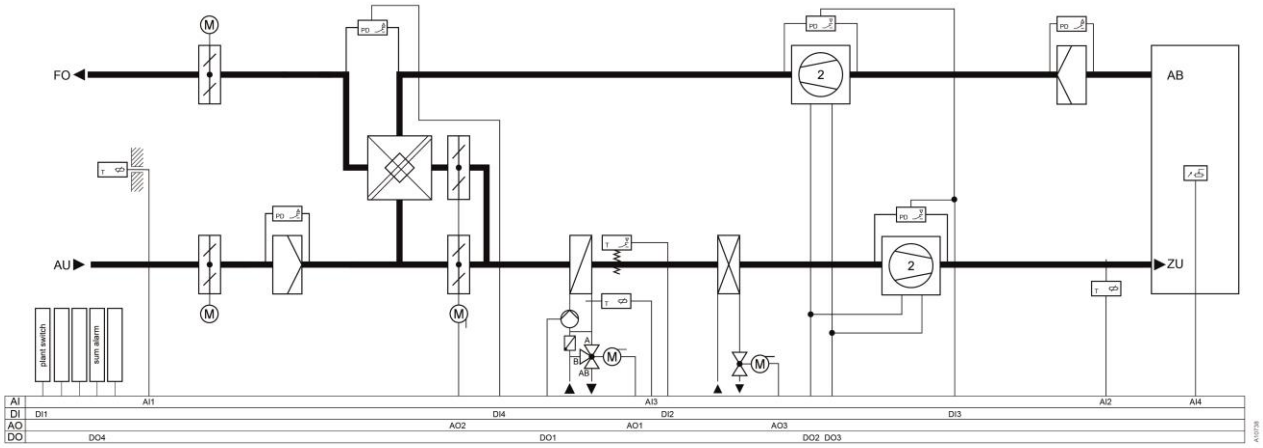
- Energy recovery using plate heat exchanger
- 2-speed fans
- Heating coil with pump, regulating valve, frost monitor, return sensor
- Air cooler with regulating valve
- Supply air sensor
- Outside sensor
- Air filter

Closed-loop control functions:

- Temperature control for constant supply air

Open-loop control functions:

- Start-up circuit
- Frost monitor for heater
- Motor/air flow monitor
- Icing monitor for heat exchanger
- Anti-jamming function for pump
- Collective alarm
- Standstill control



Brief description:
The outside air and exhaust air dampers, along with the HRec bypass valve, are closed when the plant is switched off. The plant can be switched on or off in automatic mode using a time programme or free outside air cooling.
If a fault is indicated for motor/air flow, sensor or frost-protection facility, the unit is shut down. A collective alarm can be indicated externally. The monitor for fine differential pressure on the exhaust air side protects the HRec plate coil from excessive icing. If the unit is running properly, the temperature control system corrects the variable setpoint via the heating coil, the HRec and the air cooler.
The heater start-up circuit reduces the risk of frost faults when outside temperatures are very low. The standstill control system protects the heating coil in areas not protected from frost.

Terminal assignment:

	LS	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
	MM	
	⏚	Earth wire
	+24V	+24 V DC. Reference point for digital inputs DI

1	D+	RS485 Modbus (not with web (TCP/IP) models)
2	D-	
3	C	
4	E	

42	LS	Reference point for digital outputs DO
41	DO1	Heating coil pump
40	DO2	Supply air fan, level 1
39	DO3	Supply air fan, level 2
38	DO4	Collective alarm

-	-	-
-	-	
-	-	

34	⊢	Reference potential for analogue inputs AI
33	AI1	Outside-temperature sensor
32	AI2	Sensor for supply air temperature
31	⊢	Reference potential for analogue inputs AI
30	AI3	Frost-protection sensor
29	AI4	Setpoint for room temperature

9	DI1	External OFF switch
10	DI2	Frost-protection facility
11	DI3	Supply air fan on
12	DI4	Anti-icing function

17	⊢	Reference potential for analogue outputs AO
18	AO1	Y1 actuator for heater
19	AO2	Y2 actuator for HRec
20	AO3	Y3 actuator for cooler

5.8.3 RDT815 – Cascade control

Structure of installation:

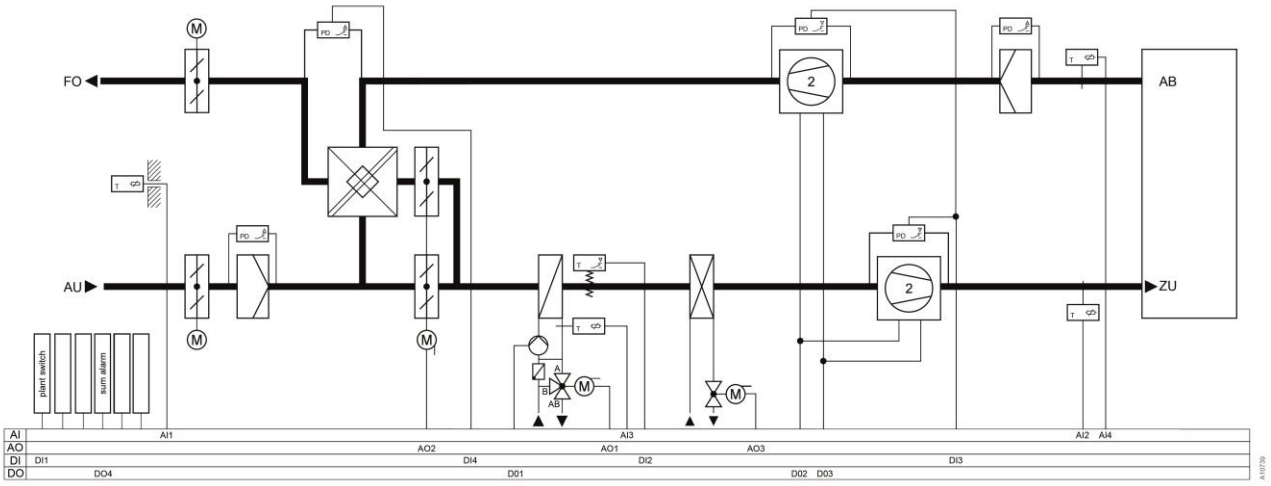
- Energy recovery using plate heat exchanger
- 2-speed fans
- Heating coil with pump, regulating valve, frost monitor, return sensor
- Air cooler with regulating valve
- Supply air sensor
- Outside and return air sensors
- Air filter

Closed-loop control functions:

- Temperature control using return-air/supply-air cascade

Open-loop control functions:

- Start-up circuit
- Free outside air cooling
- Frost monitor
- Sensor monitoring
- Min./max. limit for supply air temperature
- Motor/air flow monitor
- Anti-jamming function for pump
- Collective alarm
- Standstill control



Brief description:

The outside air and exhaust air damper, along with the HRec bypass valve, are closed when the plant is switched off. The plant can be switched on or off in automatic mode using a time programme or free outside air cooling. If a fault is indicated for the motor/air flow, frost-protection facility or supply air sensor, the plant is shut down. A collective alarm can be indicated externally. The monitor for fine differential pressure on the exhaust air side protects the HRec plate coil from excessive icing.

If the plant is running properly, the return-air/supply-air cascade temperature control corrects the variable setpoint via the heating coil, the HRec and the air cooler. If a wire breaks or there is a short circuit in the return air sensor, the sensor monitor is activated. The minimum and maximum supply air temperature is then limited. The start-up circuit reduces the risk of faults due to frost when outside temperatures are very low. The standstill control system protects the heating coil in areas not protected from frost.

Terminal assignment:

	LS	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
	MM	
	⏚	Earth wire
	+24V	+24 V DC. Reference point for digital inputs DI

1	D+	RS485 Modbus (not with web (TCP/IP) models)
2	D-	
3	C	
4	E	

42	LS	Reference point for digital outputs DO
41	DO1	Heating coil pump
40	DO2	Supply air fan, level 1
39	DO3	Supply air fan, level 2
38	DO4	Collective alarm

-	-	-
-	-	
-	-	

34	⊢	Reference potential for analogue inputs AI
33	AI1	Outside-temperature sensor
32	AI2	Sensor for supply air temperature
31	⊢	Reference potential for analogue inputs AI
30	AI3	Frost-protection sensor
29	AI4	Return air temperature

9	DI1	External OFF switch
10	DI2	Frost-protection facility
11	DI3	Supply air fan on
12	DI4	Anti-icing function

17	⊢	Reference potential for analogue outputs AO
18	AO1	Y1 actuator for heater
19	AO2	Y2 actuator for HRec
20	AO3	Y3 actuator for cooler

5.8.4 RDT828 – Cascade control with CO_2 control

Structure of installation:

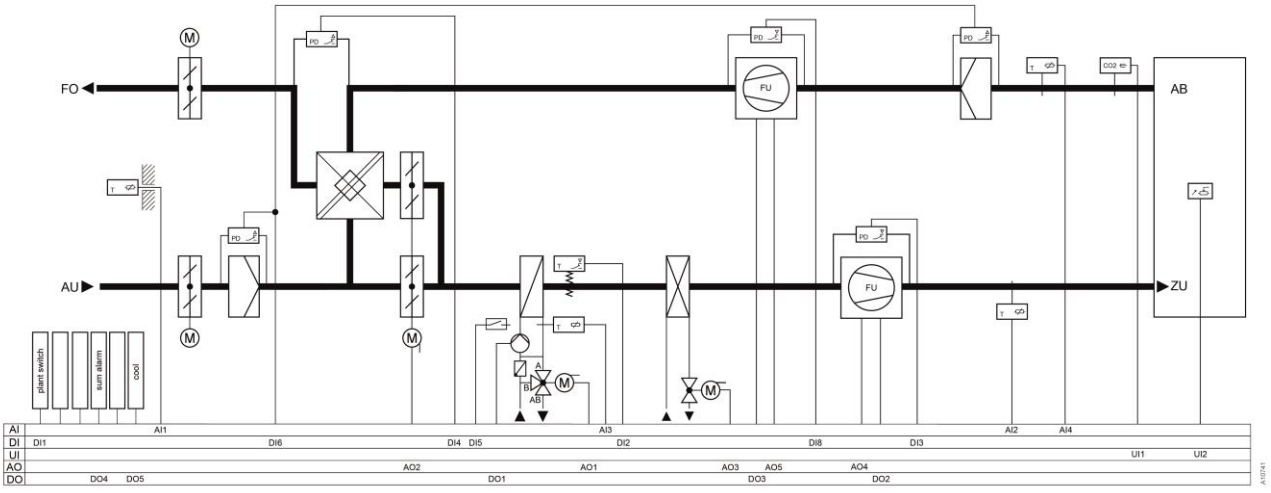
- Outside- and exhaust-air dampers
- Air filter
- Fans activated via VFD when VFD is enabled
- Heating coil with pump, regulating valve, frost monitor, return sensor
- Air cooler with regulating valve
- HRec with plate heat exchanger
- Supply air sensor
- Outside and return air sensors
- CO_2 sensor in return air

Closed-loop control functions:

- Temperature control with return-air/supply-air cascade
- Control of the CO_2 level

Open-loop control functions:

- Start-up circuit
- Filter monitoring
- Free outside air cooling
- Frost monitor
- Sensor monitoring/change-over
- Min./max. limit for inlet temperature
- Motor/air flow monitor
- Anti-jamming facility for pump
- Collective alarm
- Standstill control
- External cooling request
- HRec anti-icing function



Brief description:
The outside air and exhaust air dampers, along with the HRec bypass valve, are closed when the plant is switched off. The plant can be switched on or off in automatic mode using a time programme or free outside air cooling. If a fault is indicated for the motor/air flow, frost-protection facility or supply air sensor, the plant is shut down. A collective alarm can be indicated externally. When air filters are dirty, the filter monitor issues a maintenance message. The monitor for fine differential pressure on the exhaust air side protects the HRec plate register from excessive icing.

If the plant is running properly, the temperature control system corrects the variable setpoint via the heating coil, the air cooler and the HRec.
The CO_2 control system increases the speed of the fan according to the CO_2 level. The cold supply (e.g. supply pump or chiller) is activated using the external contacts for cooling demand. If a wire breaks or there is a short circuit in the room air or return air sensor, the sensor monitoring is activated. The minimum and maximum supply air temperature is then limited. The start-up circuit reduces the risk of faults due to frost when outside temperatures are very low. The standstill control system protects the heating coil in areas not protected from frost.

Terminal assignment:

-	LS	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
-	MM	
-	⏚	Earth wire
-	+24 V	+24 V DC. Reference point for digital inputs DI

1	D+	RS485 Modbus (not with web (TCP/IP) models)
2	D-	
3	C	
4	E	

42	LS	Reference point for digital outputs DO
41	DO1	Heating coil pump
40	DO2	Supply air fan variable-frequency drive enabled
39	DO3	Return air fan variable-frequency drive enabled
38	DO4	Collective alarm
37	DO5	Cooling demand
36	DO6	Not used
35	DO7	Not used

-	-	-
-	-	
-	-	

9	DI1	External OFF switch
10	DI2	Frost-protection facility
11	DI3	Supply air fan on
12	DI4	Anti-icing function
13	DI5	Heating coil pump on
14	DI6	Filter monitor
15	DI7	Not used
16	DI8	Return air fan on

34	⊢	Reference potential for analogue inputs AI
33	AI1	Outside temperature
32	AI2	Supply air temperature
31	⊢	Reference potential for analogue inputs AI
30	AI3	Frost-protection sensor
29	AI4	Return air temperature

17	⊢	Reference potential for analogue outputs AO
18	AO1	Y1 actuator for heater
19	AO2	Y2 actuator for HRec
20	AO3	Y3 actuator for cooler
21	AO4	Supply air fan
22	AO5	Return air fan

28	⊢	Reference potential for universal inputs UI
27	UI1	CO_2 sensor
26	UI2	Setpoint for room temperature
25	⊢	Reference potential for universal inputs UI
24	UI3	Not used
23	UI4	Not used

5.8.5 RDT828 – Cascade control with humidity control

Structure of installation:

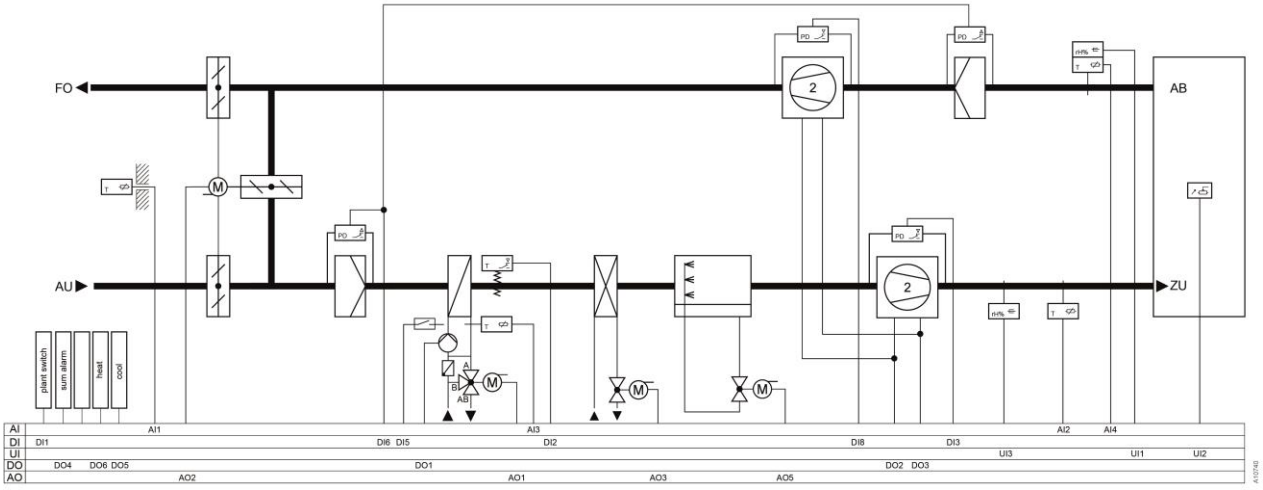
- Outside, recirculation and exhaust air dampers
- Air filter
- 2-speed fan
- Heating coil with pump, regulating valve, frost monitor, motor monitor, return sensor
- Air cooler with regulating valve
- Humidification with pump and regulating valve
- Return air, outside and return air sensors
- Humidity sensor in the return air and supply air

Closed-loop control functions:

- Temperature control with return-air/supply-air cascade
- Humidity control

Open-loop control functions:

- Start-up circuit
- Fire shut-down
- Filter monitoring
- Free outside air cooling
- Frost monitor
- Sensor monitoring
- Min./max. limit for supply air temperature
- Motor/air flow monitor
- Anti-jamming facility for pump
- Collective alarm
- Standstill control
- External heat and cooling demand



Brief description:

The outside air and exhaust air dampers, along with the HRec bypass valve, are closed when the plant is switched off. The plant can be switched on or off by a time programme in automatic mode, by the free outside air cooling or the cooling-down protection function. If a fault is indicated for the motor/air flow, frost-protection facility, supply air sensor or fire, the plant is shut down. A collective alarm can be indicated externally. When air filters are dirty, the filter monitor issues a maintenance message. The monitor for fine differential pressure on the exhaust air side protects the HRec plate coil from excessive icing.

If the plant is running properly, the temperature control system corrects the variable setpoint via the heating coil, the air cooler and the HRec. The provision of heat or

cold (e.g. supply pump, boiler or chiller) is switched on via the external contacts for heat/cooling demand.
At the same time, the humidity is regulated using a PI controller in accordance with the humidity level in the return air. A sensor in the supply air monitors the maximum humidity value.
The minimum and maximum inlet temperature is then limited. The start-up circuit reduces the risk of faults due to frost when outside temperatures are very low. The standstill control system protects the heating coil in areas not protected from frost.

Terminal assignment:

-	LS	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
-	MM	
-	⏚	Earth wire
-	+24 V	+24 V DC. Reference point for digital inputs DI

1	D+	RS485 Modbus (not with web (TCP/IP) models)
2	D-	
3	C	
4	E	

42	LS	Reference point for digital outputs DO
41	DO1	Heating coil pump
40	DO2	Supply air fan, level 1
39	DO3	Supply air fan, level 2
38	DO4	Collective alarm
37	DO5	Cooling demand
36	DO6	Heat demand
35	DO7	Not used

-	-	-
-	-	
-	-	

9	DI1	External OFF switch
10	DI2	Frost-protection facility
11	DI3	Supply air fan on
12	DI4	Not used
13	DI5	Heating coil pump on
14	DI6	Filter monitor
15	DI7	Not used
16	DI8	Return air fan

34	⊢	Reference potential for analogue inputs AI
33	AI1	Outside temperature
32	AI2	Supply air temperature
31	⊢	Reference potential for analogue inputs AI
30	AI3	Frost-protection sensor
29	AI4	Return air temperature

17	⊢	Reference potential for analogue outputs AO
18	AO1	Y1 actuator for heater
19	AO2	Y2 actuator for HRec
20	AO3	Y3 actuator for cooler
21	AO4	Not used
22	AO5	Humidity

28	⊢	Reference potential for universal inputs UI
27	UI1	Room humidity
26	UI2	Setpoint for room temperature
25	⊢	Reference potential for universal inputs UI
24	UI3	Supply air humidity
23	UI4	Not used

Index

A

Access rights 23
Air control 18
Alarm events 13
Alarms
  Alarm handling 24

B

Buttons and LEDs 9

C

Changing the battery 25

D

Date/Time 21
Demand control
  Setpoint 20
Display 8

E

Enthalpy control 17
Extended running 22

F

Fans
  Timer output ½ speed 22
  Timer output 1/1 speed 21
Functions, overview 6

H

Holidays 22
Humidity control 20
  Setpoint 20

I

Indicators 25
Information screen 24
Inputs/Outputs 13

L

Language, change 24
LEDs 25
Log off 23
Log on 23

M

Menus 10

N

Navigating the menus 10

O

Other functions 24

P

Password 23

R

Revision number 24
Running mode 11, 12
Running mode unit 12

S

Selected functions 12
Setpoint fan control 18
Setpoint humidity control 20
Setpoints temperature 14

T

Temperature 14
Time settings 21
Time/Date 21
Timer output ½ speed 22
Timer output 1/1 speed 21
Timer outputs 22

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